PART 1- GENERAL

1.1 SECTION INCLUDES

A. Lightweight, Geo-Synthetic Fill.

B. Filter Fabric.

1.2 REFERENCES

A. ASTM C 165 - Test Method for Measuring Compressive Properties of Thermal Insulation.

B. ASTM C 203 - Breaking Load and Flexural Properties of Block-Type Thermal Insulation.

C. ASTM C 303 - Test Method for Dimensions and Density of Preformed Block an Board-Type Thermal Insulation.

D. ASTM C 390 - Practice for Sampling and Acceptance of Thermal Insulation Lots.

E. ASTM D 1621 - Compressive Properties of Rigid Cellular Plastics.

F. ASTM D 1622 - Apparent Density of Rigid Cellular Plastics.

G. ASTM D 1623 - Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.

H. ASTM C 2863 - Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index).

I. ASTM D 6817 - Specification for Rigid Cellular Polystyrene Geofoam.

J. ASTM D 7557 - Standard Practice for Sampling of Expanded Polystyrene Geofoam Specimens.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Manufacturer's Preparation instructions and recommendations.
2. Manufacturer's Storage and handling requirements and recommendations.
3. Manufacturer's Installation methods.
4. Adhesive
5. Filter fabric.

B. Shop Drawings: Submit fully dimensioned layouts of the installation, including size, location, arrangement of joints, and adhesion material. Show details of fabrication and installation of geosynthetic fill, including edge of tree pit configurations, and rounding of geosynthetic fill to match final landscape forms and protection slab.

1. Provide profile and section views of entire park installation, including berms, tree pits, and surface elevation plan.
2. Indicate size, type, location, and orientation of all Geofoam blocks.
3. Show enclosure details.
4. Location and type of connectors.
5. Ballasting or guying techniques.
6. Placement sequence and methods.
7. Include coordination details for related and adjoining work. Show relative layout for all adjacent elements, all correctly dimensioned.

C. Samples:

1. Two samples, minimum size 4 inches (102 mm) square of geosynthetic fill material.
2. Connectors – each type

1.4 INFORMATIONAL SUBMITTALS

A. Qualifications of lightweight, geo-synthetic fill manufacturer.

B. Manufacturer's Certificates: Certify products meet or exceed the following:

1. Manufacturer's test reports showing the physical properties and standards for the products specified as tested in accordance with ASTM D 7557.
2. Manufacturer's Certificate of Compliance for the first 100 yd (376 m3) and for every 1500 yd3 (1147 m3) thereafter of Geofoam before product is delivered to the site.
3. Computer generated stress-strain data and the accompanying curves from compressive testing. Curves and/or data shall clearly indicate the stress at 1 percent strain and the modulus of elasticity.
4. Each delivery shall have the compression test data for each lot attached with the delivery paperwork.
5. Certificate of Compliance shall include current inspection reports showing that the Geofoam manufacturer is in compliance with a UL follow-up service program for both flame and physical properties.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Manufacturer with a minimum of 5 years documented experience in the manufacture of lightweight, geo-synthetic fill.
2. Manufacturer must also have a UL classification in category BRYX. Manufacturer must also maintain a UL classification in category QORW that ensures physical properties in accordance with ASTM D 6817.
3. Third-party certifications that only include ASTM C 578 physical properties will not be considered as an alternative equal and will be rejected.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Handle and store products in accordance the manufacturer's recommendations until ready for installation.

B. Prevent damage to the Geofoam blocks during delivery, storage, and construction.

C. Geo-Synthetic Fill that is anticipated to be exposed to sunlight for more than six months shall be covered with an opaque material to prevent ultraviolet light degradation. Remove material that is exposed for excessive period beyond six months.

D. Protect the Geo-Synthetic Fill from: organic solvents such as acetone, benzene, and paint thinner; petroleum based solvents such as gasoline and diesel fuel; and open flames.

E. Geo-Synthetic Fill should be considered combustible and should not be exposed to open flame or any source of ignition.

1.7 SEQUENCING

A. Ensure that placement drawings and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.

PART 2 PRODUCTS

2.1 MATERIALS

A. Geo-Synthetic Fill: InsulFoam GF shall conform to ASTM D 6817 and may be fabricated using material with recycled content. Blocks shall have a height of at least 36 inches (.91 m), a width of at least 48 inches (1.22 m), and length of at least 96 inches (2.44 m). Blocks shall be within tolerances of 0.5 percent of respective height, width and length dimensions. Additional field and/or shop trimming and cutting shall be required as necessitated by the geometry of the fill being constructed.

1. Type EPS39: Physical Properties when tested in accordance with ASTM D 6817 shall be:
   a) Density shall be a minimum of 2.40 lb/ft3 (38.4 kg/m3), when tested in accordance withASTM D 1622.
   b) Compressive Resistance at 1 percent deformation shall be a minimum of 15.0 psi (103 kPa) when tested in accordance with ASTM D 1621.
   c) Flexural Strength shall be a minimum of 60.0 psi (414 kPa) when tested in accordance with ASTM C 203.

d) Elastic Modulus shall be a minimum of 1500 psi (10300 kPA) when tested in accordance with ASTM C 203.
e) Oxygen Index shall have a minimum volume of 24.0 percent when tested in accordance with ASTM C 2863.

B. Connectors: Connectors shall be galvanized steel multi-barbed connectors or a urethane adhesive as recommended by the manufacturer. Each connector shall have a lateral holding strength of at least 60 lbs (27.22 kg) when tested with an EPS39 Geofoam.

C. Filter Fabric:

1. Carthage 30 Percent; SI Geosolutions Geotex 117F.,or equal

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

A. Comply with the manufacturer's current written instructions and recommendations.

3.2 EXAMINATION

A. General: Examine site and verify that conditions are suitable to receive Work and that no defects or errors are present which would cause defective installation of products or cause latent defects in workmanship and function.

B. Substrate:

1. Verify that substrate surfaces are finished correctly and are installed at the correct elevations and slopes.
2. Verify concrete subslab has cured for at least 28 days.
3. Allow new concrete substrates to cure 28 days at 70 degrees Fahrenheit (21 degrees Celsius) prior to installation of setting materials.
4. Clean dirt, oil, grease, plaster, sealers, curing compounds, form oil, loose plaster, paint, scale, and other materials from subslab.

C. Drainage Layer: Verify that rigid drain mat has been installed.

D. Protection:

1. Use every possible precaution to prevent damage to existing conditions to remain such as structures, utilities, plant materials and walks on or adjacent to the site of the Work.
2. Use every possible precaution to prevent excessive compaction of planting area soil or soil mixes within or adjacent to the areas of Work.
3. Provide barricades, fences or other barriers to protect existing conditions to remain from damage and excessive compaction during construction.
4. Do not store materials or equipment, permit burning, or operate or park equipment under the branches of plants to remain.
5. Submit written notification of damaged plants and structures to the Owner's Representative.

3.3 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces for uniform bearing using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.4 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Geo-Synthetic Fill shall be placed to the lines and grades shown in the Drawings and as directed by the Owner's Representative. The surface of a layer of Geo-Synthetic Fill blocks to receive additional Geo-Synthetic Fill blocks shall be constructed with a variation in surface tolerance of no more than 0.05 feet (15 mm) in any 10 foot (3 m) interval.

C. All blocks shall accurately fit relative to adjacent blocks. No gaps greater than 0.07 feet (20 mm) will be allowed on vertical joints.

D. Finished surfaces of the Geo-Synthetic Fill immediately beneath pavement sections shall be constructed to within the tolerance of zero to minus 1/4-inch (6 mm) of the indicated grade

E. Finished surfaces of the Geo-Synthetic Fill on side slopes that receive soil cover shall be constructed to within a tolerance of plus 1/2-inch (20 mm) to minus 1/4-inch (12 mm) of the indicated grade.

F. Blocks placed in a row in a particular layer shall be offset 2.0 feet (0.6 m) relative to blocks placed in adjacent rows of the same layer as shown on the Drawing. In order to avoid continuous joints, each subsequent layer of blocks shall be rotated on the horizontal plane 90 degrees from the direction of placement of the previous layer placed.

G. When needed to prevent blocks sliding during embankment construction, galvanized steel multi- barbed connector plates from Insulfoam or urethane adhesive shall be placed between horizontal layers of blocks. Install a minimum of 2 connectors for each 4 feet (1.22 m) by 8 feet (2.44 m) section of Geofoam material or as shown on plans or directed by the Owner's Representative. Press firmly into the rigid foam until the connector is flush with the surface. Position the next foam block as specified and seat firmly before placing subsequent blocks. Fastners or adhesives shall be noted on shop drawings.

H. Blocks shall be cut using a hot wire.

I. Because of the light unit-weight of the geofoam fill, provide temporary weighting and/or guying as necessary until all the blocks are built into a homogeneous mass, and the pavement section as well as any soil cover are in place.

J. During placement of the load distribution slab over the top surface of the Geo-Synthetic Fill, it is permissible to use rebar supports to support the reinforcing steel during concrete placement.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Repair or replace damaged products before Substantial Completion.

END OF SECTION